

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
18 December 2003 (18.12.2003)

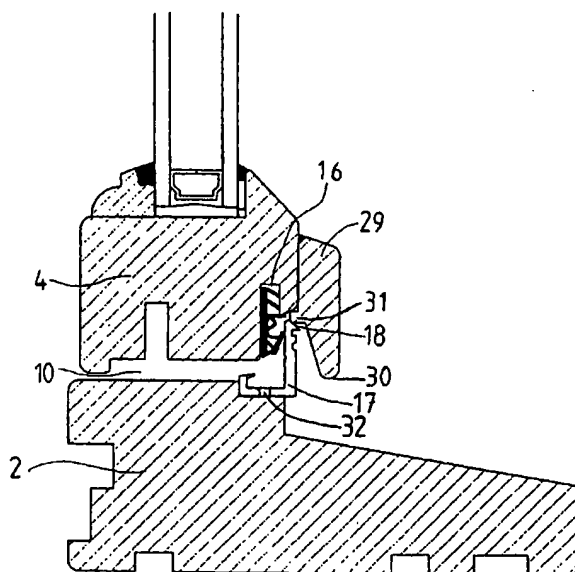
PCT

(10) International Publication Number  
**WO 03/104598 A1**

- (51) International Patent Classification<sup>7</sup>: **E06B 3/44**
- (21) International Application Number: **PCT/DK03/00370**
- (22) International Filing Date: **6 June 2003 (06.06.2003)**
- (25) Filing Language: **English**
- (26) Publication Language: **English**
- (30) Priority Data:  
PA 2002 00876 **7 June 2002 (07.06.2002)** **DK**
- (71) Applicant (for all designated States except US):  
**VRØGUM VINDUER A/S [DK/DK]; Industrivej 1,  
DK-6840 Oksbøl (DK).**
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **MØLGAARD, Kurt**  
[DK/DK]; Fiilsøvej 44, Vrøgum, DK-6840 Oksbøl (DK).
- (74) Agent: **BUDDE, SCHOU & OSTENFELD A/S; Vester  
Søgade 10, DK-1601 Copenhagen V (DK).**
- (81) Designated States (national): **AE, AG, AL, AM, AT (utility model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EC, EE (utility model), EE, ES, FI (utility model), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK (utility model), SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.**
- (84) Designated States (regional): **ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).**
- Published:**  
— with international search report  
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: **A SLIDING SASH WINDOW**



(57) Abstract: A sliding sash window comprising a frame having a bottom horizontal element (2) and an outer sash and an inner sash (4) slidably arranged between an upper position and a lower position, a narrow gap (10) being defined between the inner sash (4) and the bottom element (10) when the inner sash is in its lower, closed position, a sealing strip or list (17) being arranged on said bottom element (2) and a list or strip (29) being arranged on the bottom outer edge of the sash (4) for protecting the narrow gap (10) against entry of wind-driven rain into the gap, a further strip, rib or ridge (31) projecting inwards from the list (29) for sealingly engaging the top edge of the sealing strip (18) in the lower, closed position of the inner sash.

WO 03/104598 A1

WO 03/104598 A1



---

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

### A sliding sash window

The present invention relates to a sliding sash window comprising a frame having a top horizontal element and a bottom horizontal element  
5 interconnected by two vertical elements and also comprising an outer sash and an inner sash slidably arranged between an upper position and a lower position in two opposed outer track elements and two opposed inner track elements, respectively, attached to said vertical elements, a first narrow gap being defined between said outer sash and said top element when said outer sash is  
10 in said upper position, and a second narrow gap being defined between said inner sash and said bottom element when said inner sash is in said lower position.

Sliding sash windows of this type are known. It is a difficulty in connection with  
15 such windows to ensure that the window in closed condition is water-tight, i.e. that no water may enter the building through the closed window.

A sliding sash window of the type in question is known from US patent No. 5,185,955 to Pedersen. In this known window, the narrow gaps between the  
20 outer sash and the inner sash, respectively, and the top and bottom horizontal members, respectively, of the frame are not protected sufficiently against entrance of wind-driven rain into the respective gap. Therefore, such wind-driven water may penetrate through the seals provided if such seals are not completely water-tight. Furthermore, the water may accumulate in the gaps,  
25 particularly in said first narrow gap between the outer sash and the frame, and spill into the inner of the building when the window is opened.

A main object of the present invention is to enhance the water-tightness of sliding sash windows of the type indicated. This object is achieved according to  
30 the invention by providing the sash window with a first rib, list or strip arranged along the bottom outer edge of said top element such that said first narrow gap is protected against entry of wind-driven rain when said outer sash is in said upper position, and/or with a second rib, list or strip arranged along the bottom

outer edge of said inner sash such that said second narrow gap is protected against entry of wind-driven rain when said inner sash is in said lower position. Hereby, wind-driven rain is blocked by said ribs, list or strips and cannot enter the narrow gaps.

5

According to the invention said first rib, list or strip extends downwards at least 2 mm beyond the top outer edge of said outer sash when said outer sash is in said upper position, preferably at least 4 mm, more preferably at least 6 mm, even more preferably at least 8 mm and most preferably at least 10 mm.

10

In the currently preferred embodiment of the invention, said rib is integral with said top element. This is a particularly economical and esthetically pleasing solution.

15 In the currently preferred embodiment of the invention, said top outer edge of said outer sash is constituted by the top edge of an upwardly protruding horizontal rib or ridge attached to or integral with said outer sash.

According to the invention, said second rib, list or strip extends downwards at  
20 least 2 mm beyond the top edge of said bottom element when said inner sash is in said lower position, preferably at least 4 mm, more preferably at least 6 mm, even more preferably at least 8 mm and most preferably at least 10 mm.

In the currently preferred embodiment of the invention, said top edge of said  
25 bottom element is constituted by the top edge of a horizontally extending sealing strip or bead adapted for sealingly engaging a horizontally extending sealing member arranged at the bottom outer edge of said inner sash.

So as to allow inwards tilting of the inner sash for cleaning purposes, the two  
30 lateral surfaces of the inner sash each are provided with a longitudinally extending guide element for slidingly receiving a first slide element arranged at one end of each of two elongate tilting fittings adapted for limiting inwards tilting of the inner sash in the lower position thereof, a second slide element at the

opposite end of each of said tilting fittings being slidably received in a respective one of said inner track elements of said frame, a removable stop element being arranged at a point along the length of each of said guide elements and being adapted for stopping the slide of said first slide element  
5 downwards along said guide element such that the inwards tilting of said inner sash thereby is limited. Hereby a particularly simple and cheap tilting mechanism is obtained.

In the currently preferred embodiment of the invention, said guide element at a  
10 point below said stop element is configured such that said first slide element may be disengaged from said guide element when said stop element is removed and said slide element is allowed to be located at said point such that said inner sash is disconnected from said tilting fitting. Hereby, the inner sash may be disengaged from the tilting fitting in a particularly simple manner.

15 In the currently preferred embodiment of the invention, said guide element is constituted by a tube or hollow profile rail provided with a longitudinal slit and dimensioned to slidably retain said first slide element inside said tube or hollow rail, said stop element being removably fastened inside said tube, and said slit  
20 having an enlarged portion at said point below said stop large enough to allow said first slide element to exit said tube at said point.

In another aspect, the present invention relates to a sliding sash window comprising a frame having a top horizontal element and a bottom horizontal  
25 element interconnected by two vertical elements and an inner sash slidably arranged between an upper position and a lower position in two opposed track elements attached to said vertical elements, the two lateral surfaces of the inner sash each being provided with a longitudinally extending guide element for slidably receiving a first slide element arranged at one end of each of two  
30 elongate tilting fittings adapted for limiting inwards tilting of the inner sash in the lower position thereof, a second slide element at the opposite end of each of said tilting fittings being slidably received in a respective one of said inner track elements of said frame, a removable stop element being arranged at a

point along the length of each of said guide elements and being adapted for stopping the slide of said first slide elements downwards along said guide element such that the inwards tilting of said inner sash thereby is limited.

- 5 In the currently preferred embodiment of the invention, said guide element at a point below said stop element is configured such that said first slide element may be disengaged from said guide element when said stop element is removed and said slide element is allowed to be located at said point such that said inner sash is disconnected from said tilting fitting.

10

- In the currently preferred embodiment of the invention, said guide element is constituted by a tube or hollow profile rail provided with a longitudinal slit and dimensioned to slidably retain said first slide element inside said tube or hollow rail, said stop element being removably fastened inside said tube, and said slit  
15 having an enlarged portion at said point below said stop large enough to allow said first slide element to exit said tube at said point.

- In the currently preferred embodiment of the invention, said inner sash in its lowermost position is arranged rotatable or tiltable inwards around pivots  
20 arranged at the lower corners thereof, said pivots being slidably received in said track elements, a slidable bolt being arranged at each upper corner of said inner sash slidable between a non-tilting position wherein an end of each bolt is slidably received in a respective one of said track elements and a tilting position wherein said end of each bolt is disengaged from said respective track  
25 element.

In the following the invention will be explained more in detail with reference to a currently preferred embodiment thereof shown, solely by way of example, in the drawings, wherein

30

Fig. 1 is a diagrammatical frontal elevational view of a sash window according to the invention seen from the inside towards the outside of the building in which the window is intended to be installed,

Fig. 2 is a sectional view taken along line A-A in Fig. 1,

Fig. 3 is an enlarged scale sectional view taken along line B-B in Fig. 1,

5

Fig. 4 is an enlarged scale sectional view taken along C-C in Fig. 1,

Fig. 5 is a diagrammatical perspective view of the window in Fig. 1 seen from the inside and with the lower sash in fully inwards tilted position,

10

Fig. 6 is a cutaway perspective view of the upper left corner of the frame with the inner sash nearly in its uppermost position,

Fig. 7 is a perspective lateral view of the inner sash in nearly fully inwards tilted position, and

15

Fig. 8 is a cutaway view opposite the view in Fig. 7.

Fig. 9 is a diagrammatic view of a second embodiment of the present invention with the inner sash in a lower and closed position.

20

Fig. 10 is a diagrammatic view of a second embodiment of the present invention with the inner sash in a lower and open position.

Referring now to Figs. 1 – 2, a sliding sash window 1 according to the invention comprises a frame 2, an upper outer sash 3 and a lower inner sash 4. The outer sash 3 is slidably arranged in the frame 2 in a vertical guide or track 5 while the inner sash 4 is slidably arranged in the frame 2 by means of a vertical guide or track 6.

30

The arrangement and construction of the sash window 1 according to the invention is, where differences are not specifically described, as described and

shown in US patent 5,185,955 to Petersen which hereby is incorporated herein by reference.

5 The inner lower sash 4 is shown in its lowermost closed position, a handle 7 being provided for operating the transverse displacement of the lower sash for establishing locking and sealing thereof, while the upper outer sash 3 shown in its uppermost locked and sealed position, a handle 8 being provided for operating the transverse displacement of the upper sash for establishing locking and sealing thereof.

10

Referring now to Figs. 3 – 4, it is shown that in the locked and sealed positions of the upper and lower sash, 3 and 4, respectively, a narrow gap 9 is formed between the upper sash 3 in the frame 2 and a narrow gap 10 is formed between the lower sash 4 and the frame 2.

15

Collaborating sealing strips 11 and 12 on the frame 2 and the upper sash 3, respectively, are intended for sealing the inner upper edge of the sash 3 against the frame 2. However, this sealing function may over time develop weaknesses, and therefore it is desirable that any water originating from wind-driven rain be prevented from entering the narrow gap 9 and from there flowing to the inner side of the sash 3 either through a weakness in the sealing abutment between the sealing members 11 and 12 or when the upper sash 3 is lowered to an open position.

25 A ridge or rib 13 projects upwards from the outer upper corner of the upper sash 3, the upper edge of the rib 13 constituting the highest edge of the sash 3. A downward projecting rib 14 is formed integrally on the lower front edge of the upper horizontal element of the frame 2. The bottom edge 15 of the rib 14 is rounded to form a drip edge. The bottom edge 15 of the rib 14 is approximately  
30 10 mm lower than the top edge of the rib 13. Hereby, wind-driven rain is prevented from entering the narrow gap 9, whereby the security against water penetrating to the interior side of the window through the narrow gap 9 is substantially enhanced.



The lower inner sash 4 is sealed against the frame 2 by abutment of a sealing strip 16 at the lower outer edge of the sash 4 against an aluminium rib or bead 17 mounted on the lower horizontal element of the frame 2. A top edge 18 of the aluminium rib 17 constitutes the highest edge of this element of the frame 2. A rib or strip 19 is attached to the outer lower surface of the sash 4 and has a lowermost rounded drip edge 20 located approximately 10 mm below the top edge 18 of the rib 17 in the shown closed position of the inner sash 4.

10 Hereby, wind-driven rain is prevented from penetrating into the narrow gap 10 if any weakness in the sealing function of the collaborating sealing elements 16 and 17 is developed over time.

Referring now to Figs. 5 - 8, the lower inner sash 4 is shown in an inwardly tilted position to allow cleaning of the outer side of the glass of the inner sash 4. The sash 4 pivots around not shown pivots located at the bottom corners of the sash 4 and slidably received in the tracks 6.

Tilt limiting rods 21 have sliding members 22 and 23 at opposed ends thereof. Sliding members 23 are slidably received in the tracks 6 while sliding members 22 are slidably received in tracks 23 arranged on the vertical outer surfaces of the sash 4.

A sliding bolt 25 is arranged at each one of the top corners of the inner sash 4 and has a locking projection 26 that can be slidably received in the tracks 6 when the bolt 25 is fully extended and can be disengaged from the tracks 6 by sliding each bolt 25 back when the sash 4 is to be tilted inwards pivoting by around the not shown pivots at the bottom corners of the sash 4.

30 When the sash 4 is to be tilted from the vertical position shown in Fig. 2 to the tilted position shown in Figs 5 and 7-8, the bolts 25 are slid back until the projections 26 disengage the tracks 6 such that the sash can pivot freely. During the pivoting or tilting, the slide elements 22 and 23 slide down and up,

respectively, in the tracks 6 and 24, respectively, until slide element 21 is stopped by a stop member 27. The sash cannot be tilted further because of the limit of the slide of the slide element 22 by the stop member 27 that is constituted by screw screwed into the sash and having its head protruding into  
5 the track 6, the head functioning as a blocking member for blocking passage of the sliding element 22.

The track 24 is constituted by a U profile rib with inwardly bent end portions. At 28, a portion of one of the lateral walls with inwardly bent end portions has been cut away. If the stop member 27 is displaced by screwing the screw  
10 further into the sash such that the screw head is displaced sufficiently to allow the slide element 22 to pass until it reaches the cut away region 28 through which the slide element 22 can be disengaged from the track 23 thus freeing the sash for removal from the frame, the not shown pivots at the bottom corners of the sash being arranged disengageable from the tracks 6 in a known  
15 manner, for instance as shown in US patent No. 5,185,955 Incorporated herein by reference.

Hereby, the sash 4 may be mounted and dismounted from the frame 2 in a quick and easy manner.

20

One of the tilt limiting rods may be dispensed with such that only a single rod is provided at one side of the sash 4.

Referring now to Figs. 9 - 10, the lower inner sash 4 is shown in a locked and  
25 sealed position, and in an open position, respectively. Elements that are the same as previously described are given the same reference numerals as in the Figs. 1 - 8 embodiment.

A narrow gap 10 is formed between the lower sash 4 and the frame 2. The  
30 lower inner sash 4 is sealed against the frame 2 by abutment of a sealing strip 16 at the lower outer edge of the sash 4 against an aluminium rib or bead 17 mounted on the lower horizontal element of the frame 2. A top edge 18 of the aluminium rib 17 constitutes the highest edge of this element of the frame 2. A

rib or strip 29 is attached to the outer lower surface of the sash 4 and has a lowermost rounded drip edge 30 located approximately 15 mm below the top edge 18 of the rib 17 in the shown closed position of the inner sash 4. From the side of the rib or strip 29 facing the sash 4 a bead or rib or ridge 31 projects so far that it engages the top edge 18 of the aluminium rib 17 for creating a further seal when the sash 4 is in the lower position. The bead or rib or ridge 31 may be an integrated part of the rib or strip 29 alternatively the bead or rib or ridge 31 may be constituted by a separate elastic element attached to or embedded into the rib or strip 29.

10

Hereby, wind-driven rain is prevented from penetrating into the narrow gap 10 if any weakness in the sealing function of the collaborating sealing elements 16 and 17 is developed over time.

15 The sealing element 17 also includes a groove 32 for collecting and draining any rain or moisture in the narrow gap 10. The sealing element 17 is slightly slanted or sloped such that the rain or moisture is lead to one or more drainage holes or perforations in the bottom element 2.

20 Referring now again to Fig. 3, a not shown sealing bead, rib or ridge similar to the rib 31 in Figs. 9 - 10 may be provided on the top horizontal element, the bead, rib or ridge projecting from the downward projecting rib 14 may be provided for sealingly engaging the rib or ridge 13 when the outer sash is in the upper closed position. The bead or rib or ridge may be constituted by a  
25 separate elastic element attached to or embedded into the downward projecting rib 14, alternatively the bead or rib or ridge may be integral with the downward projecting rib 14.

## CLAIMS

1. A sliding sash window comprising
  - 5 - a frame having a top horizontal element and a bottom horizontal element interconnected by two vertical elements,
    - an outer sash and an inner sash slidably arranged between an upper position and a lower position in two opposed outer track elements and two opposed inner track elements, respectively, attached to said vertical elements, a first
    - 10 narrow gap being defined between said outer sash and said top element when said outer sash is in said upper position, and a second narrow gap being defined between said inner sash and said bottom element when said inner sash is in said lower position
    - a first rib, list or strip arranged along the bottom outer edge of said top
    - 15 element such that said first narrow gap is protected against entry of wind-driven rain when said outer sash is in said upper position, and/or
    - a second rib, list or strip arranged along the bottom outer edge of said inner sash such that said second narrow gap is protected against entry of wind-driven rain when said inner sash is in said lower position.
  - 20
2. A window according to claim 1, wherein said first rib, list or strip extends downwards at least 2 mm beyond the top outer edge of said outer sash when said outer sash is in said upper position, preferably at least 4 mm, more preferably at least 6 mm, even more preferably at least 8 mm and most
- 25 preferably at least 10 mm.
3. A window according to claim 2, wherein said rib is integral with said top element.
- 30 4. A window according to claim 2 or 3, wherein said top outer edge of said outer sash is constituted by the top edge of an upwardly protruding horizontal rib or ridge attached to or integral with said outer sash.

5. A window according to any of the preceding claims, wherein said second rib, list or strip extends downwards at least 2 mm beyond the top edge of said bottom element when said inner sash is in said lower position, preferably at least 4 mm, more preferably at least 6 mm, even more preferably at least 8 mm and most preferably at least 10 mm.

6. A window according to claim 5, wherein said top edge of said bottom element is constituted by the top edge of a horizontally extending sealing strip or bead adapted for sealingly engaging a horizontally extending sealing member arranged at the bottom outer edge of said inner sash.

7. A window according to any of the preceding claims, wherein said second rib, list or strip comprises an additional bead or rib or ridge projecting from the side of said second rib, list or strip facing said inner sash such that said bead or rib or ridge engages said top edge of said sealing strip or bead when said inner sash is in said lower position.

8. A window according to claim 7, wherein said bead or rib or ridge is constituted by an element attached to said rib, list or strip.

9. A window according to claim 7, wherein said bead or rib or ridge is integrated with said rib, list or strip.

10. A window according to claims 8 or 9, wherein said bead or rib or ridge is of a resilient material, such as rubber, silicone or the like.

11. A window according to any of the claims 1 to 10, wherein said first rib, list or strip comprises an additional bead or rib or ridge projecting from the side of said first rib, list or strip facing said outer sash such that said bead or rib or ridge engages said top edge of said outer sash, when said outer sash is in said upper position.

12. A window according to claim 11, wherein said bead or rib or ridge is constituted by an element attached to said rib, list or strip.
13. A window according to claim 11, wherein said bead or rib or ridge is  
5 integrated with said rib, list or strip.
14. A window according to claims 12 or 13, wherein said bead or rib or ridge is of a resilient material, such as rubber, silicone and the like.
- 10 15. A window according to any of the preceding claims, wherein the two lateral surfaces of the inner sash each are provided with a longitudinally extending guide element for slidingly receiving a first slide element arranged at one end of each of two elongate tilting fittings adapted for limiting inwards tilting of the inner sash in the lower position thereof, a second slide element at the opposite  
15 end of each of said tilting fittings being slidingly received in a respective one of said inner track elements of said frame, a removable stop element being arranged at a point along the length of each of said guide elements and being adapted for stopping the slide of said first slide element downwards along said guide element such that the inwards tilting of said inner sash thereby is limited.
- 20 16. A window according to claim 15, wherein said guide element at a point below said stop element is configured such that said first slide element may be disengaged from said guide element when said stop element is removed and said slide element is allowed to be located at said point such that said  
25 inner sash is disconnected from said tilting fitting.
17. A window according to claim 15 or 16, wherein said guide element is constituted by a tube or hollow profile rail provided with a longitudinal slit and dimensioned to slidingly retain said first slide element inside said tube or hollow  
30 rail, said stop element being removably fastened inside said tube, and said slit having an enlarged portion at said point below said stop large enough to allow said first slide element to exit said tube at said point.

- 18 A sliding sash window comprising
- a frame having a top horizontal element and a bottom horizontal element interconnected by two vertical elements,
  - an inner sash slidably arranged between an upper position and a lower
- 5 position in two opposed track elements attached to said vertical elements,

the two lateral surfaces of the inner sash each being provided with a longitudinally extending guide element for slidably receiving a first slide element arranged at one end of each of two elongate tilting fittings adapted for

10 limiting inwards tilting of the inner sash in the lower position thereof, a second slide element at the opposite end of each of said tilting fittings being slidably received in a respective one of said inner track elements of said frame, a removable stop element being arranged at a point along the length of each of said guide elements and being adapted for stopping the slide of said first slide

15 elements downwards along said guide element such that the inwards tilting of said inner sash thereby is limited.

19. A window according to claim 18, wherein said guide element at a point below said stop element is configured such that said first slide element may

20 be disengaged from said guide element when said stop element is removed and said slide element is allowed to be located at said point such that said inner sash is disconnected from said tilting fitting.

20. A window according to claim 18 or 19, wherein said guide element is

25 constituted by a tube or hollow profile rail provided with a longitudinal slit and dimensioned to slidably retain said first slide element inside said tube or hollow rail, said stop element being removably fastened inside said tube, and said slit having an enlarged portion at said point below said stop large enough to allow said first slide element to exit said tube at said point.

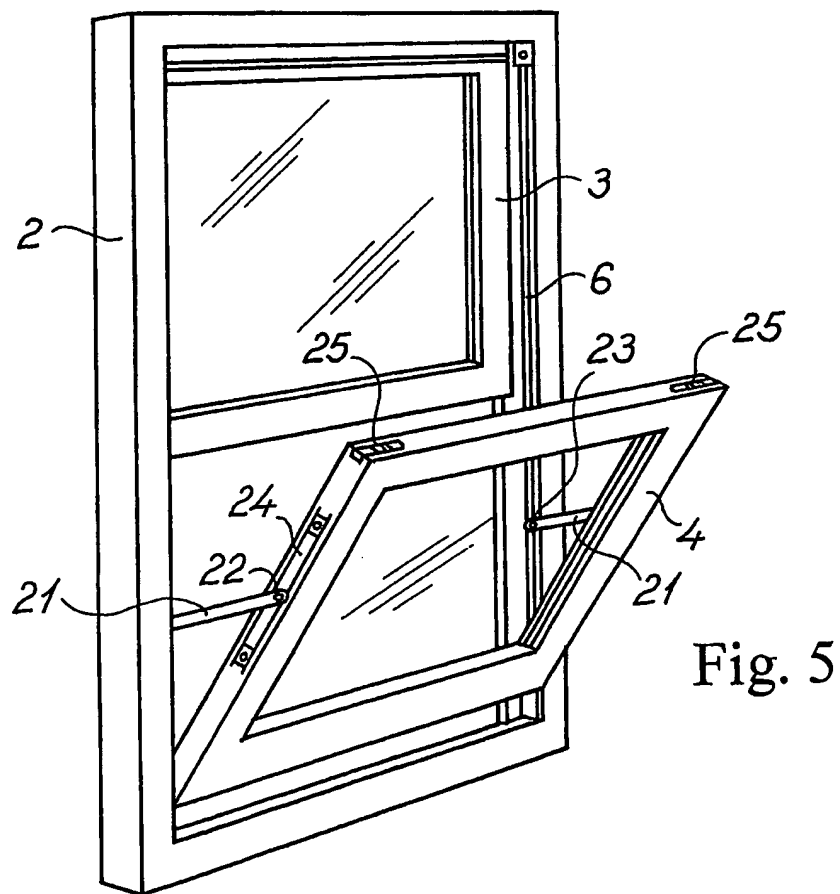
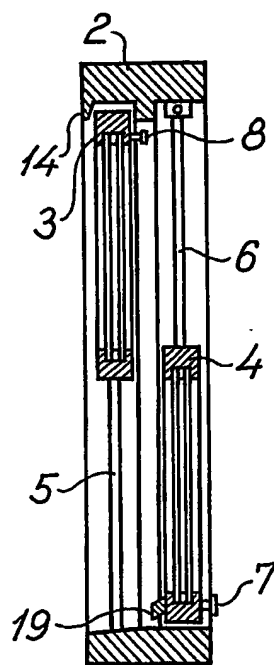
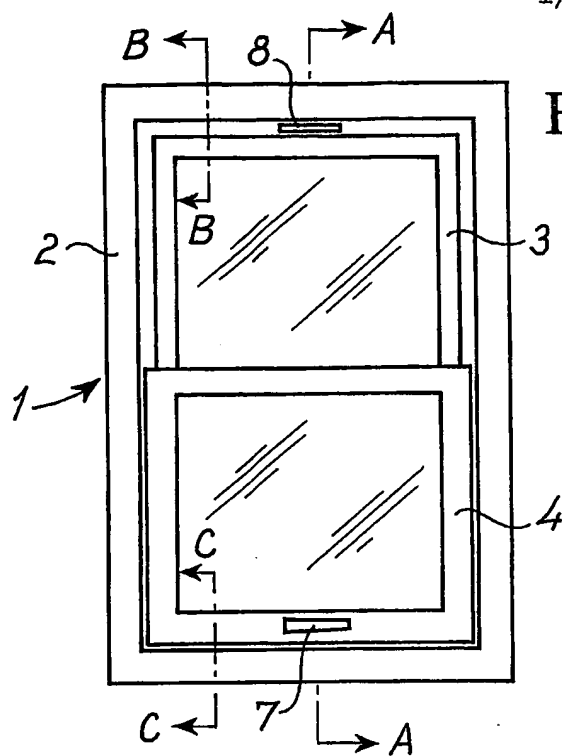
30

21. A window according to any of the preceding claims, wherein said inner sash in its lowermost position is arranged rotatable or tiltable inwards around pivots arranged at the lower corners thereof, said pivot being slidably received in said

track elements, a slidable bolt being arranged at each upper corner of said inner sash slidable between a non-tilting position wherein an end of each bolt is slidably received in a respective one of said track elements and a tilting position wherein said end of each bolt is disengaged from said respective track  
5 element.



1/5



2/5

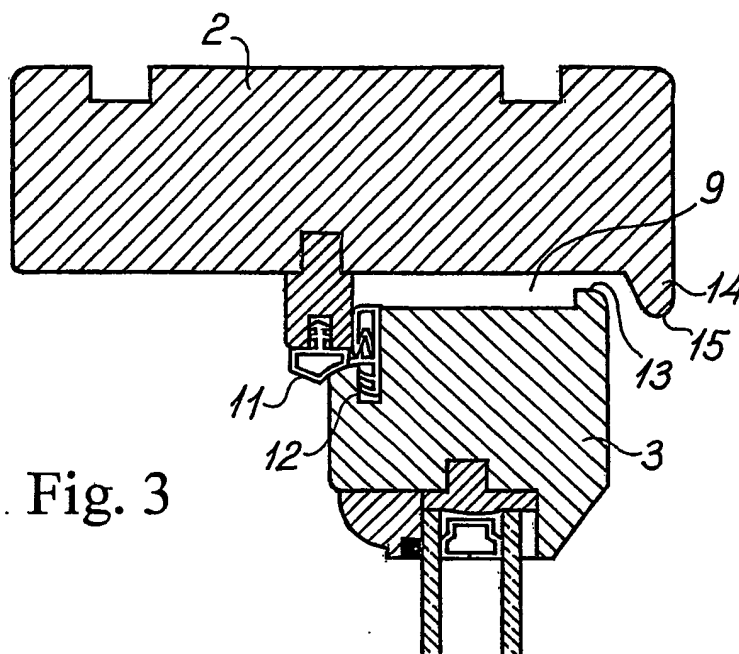


Fig. 3

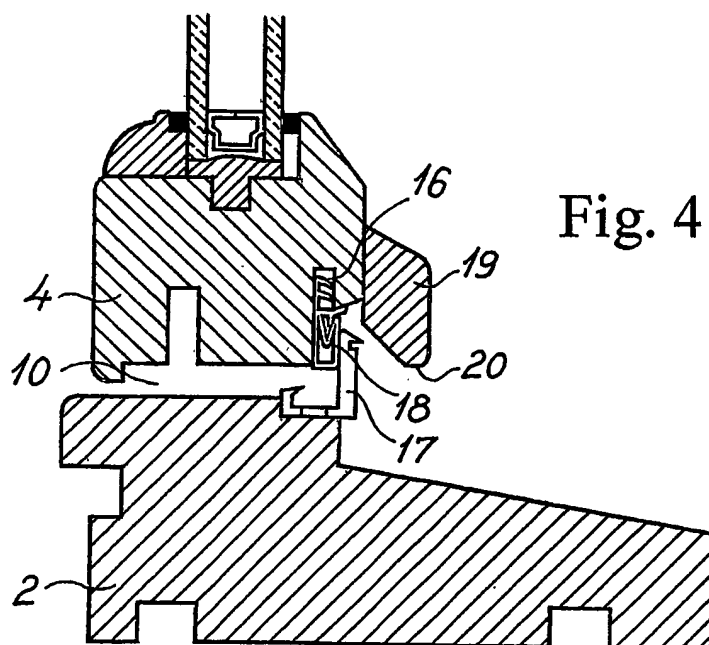


Fig. 4

Fig. 7

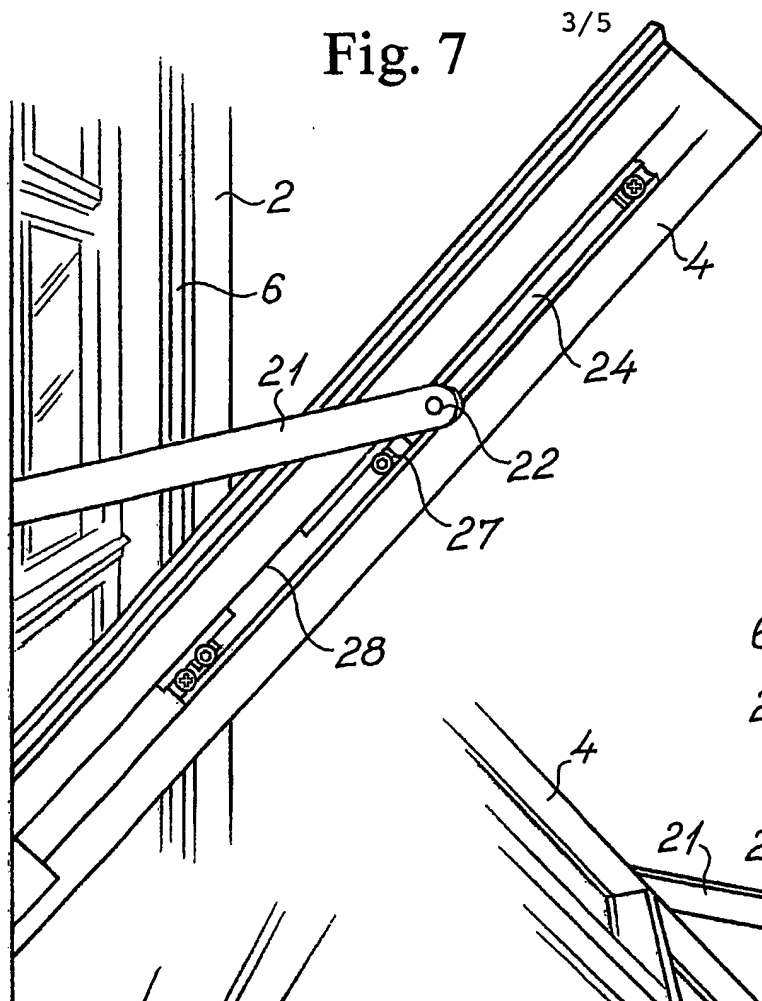


Fig. 8

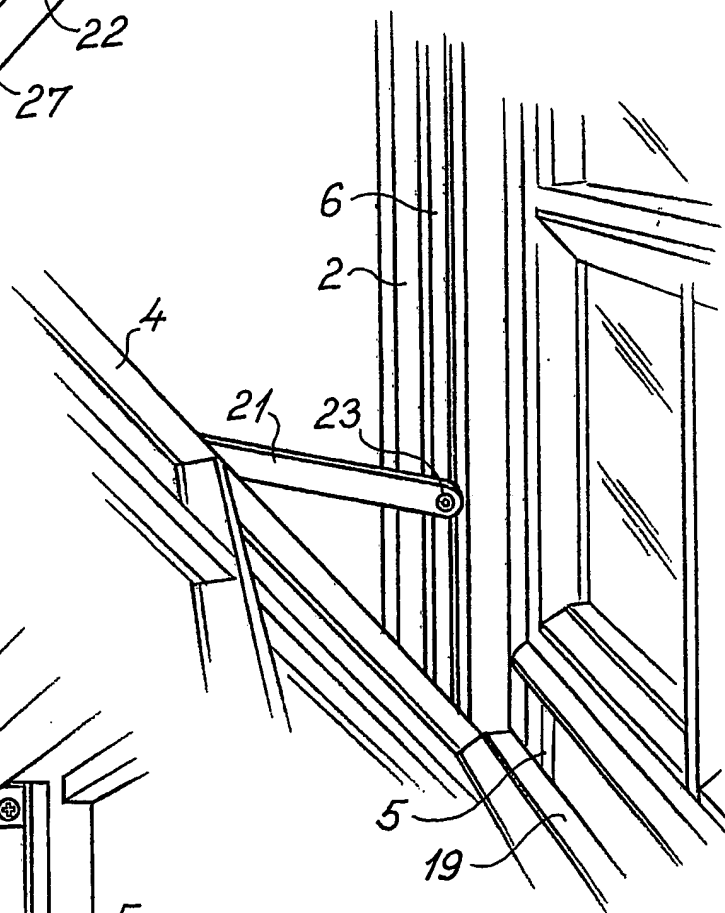
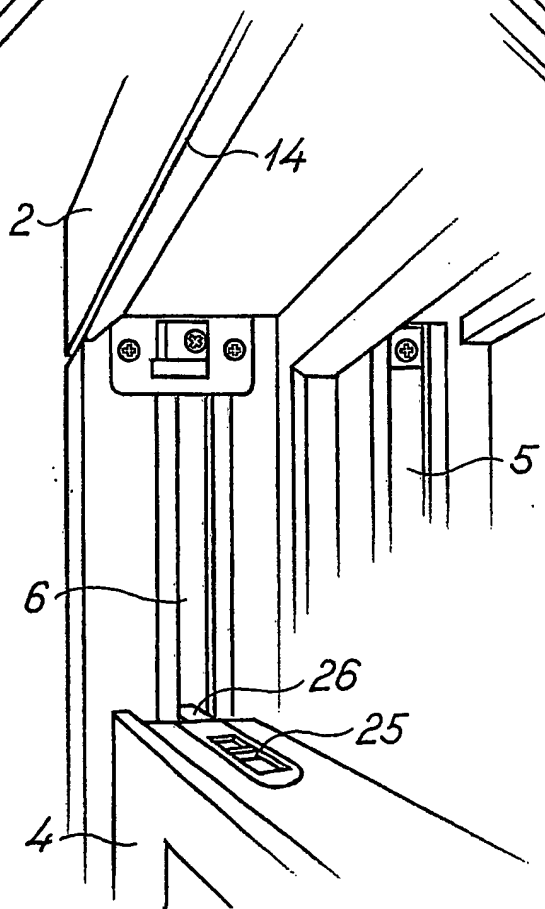


Fig. 6



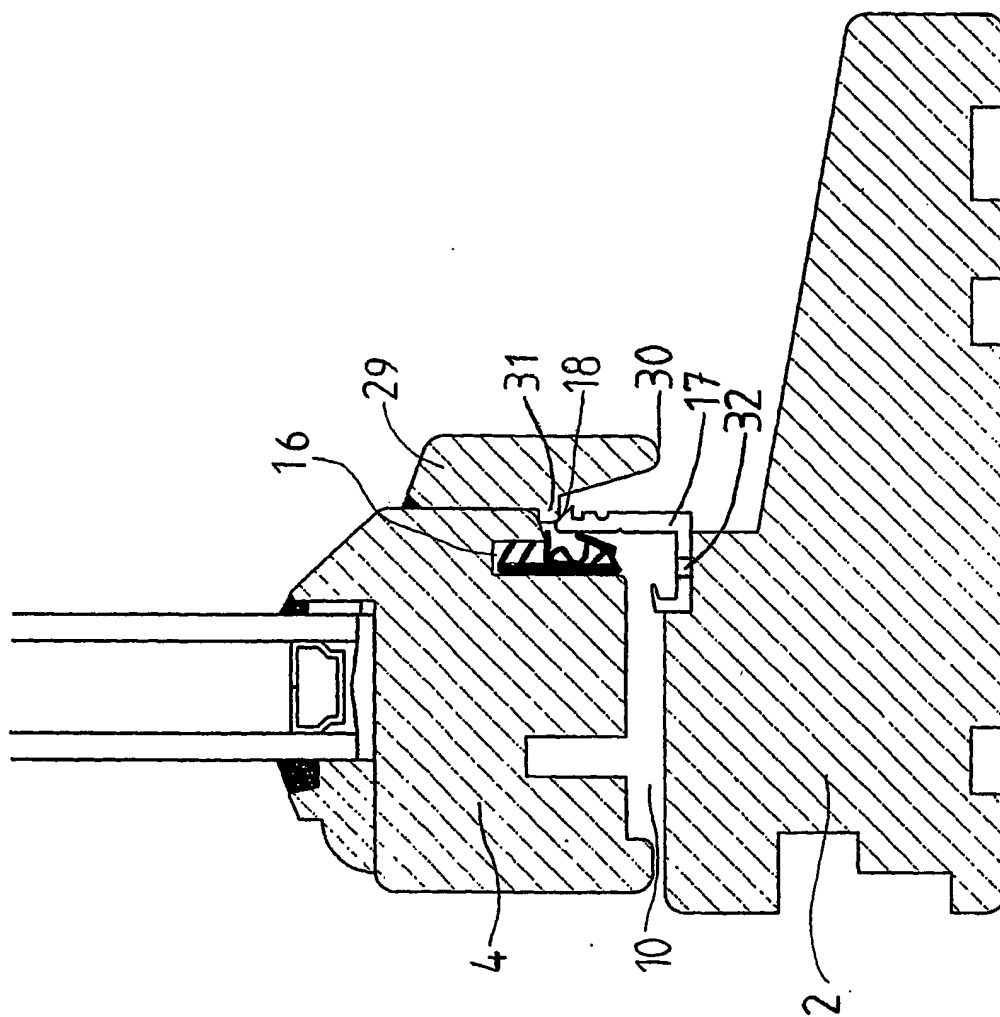


Fig. 9

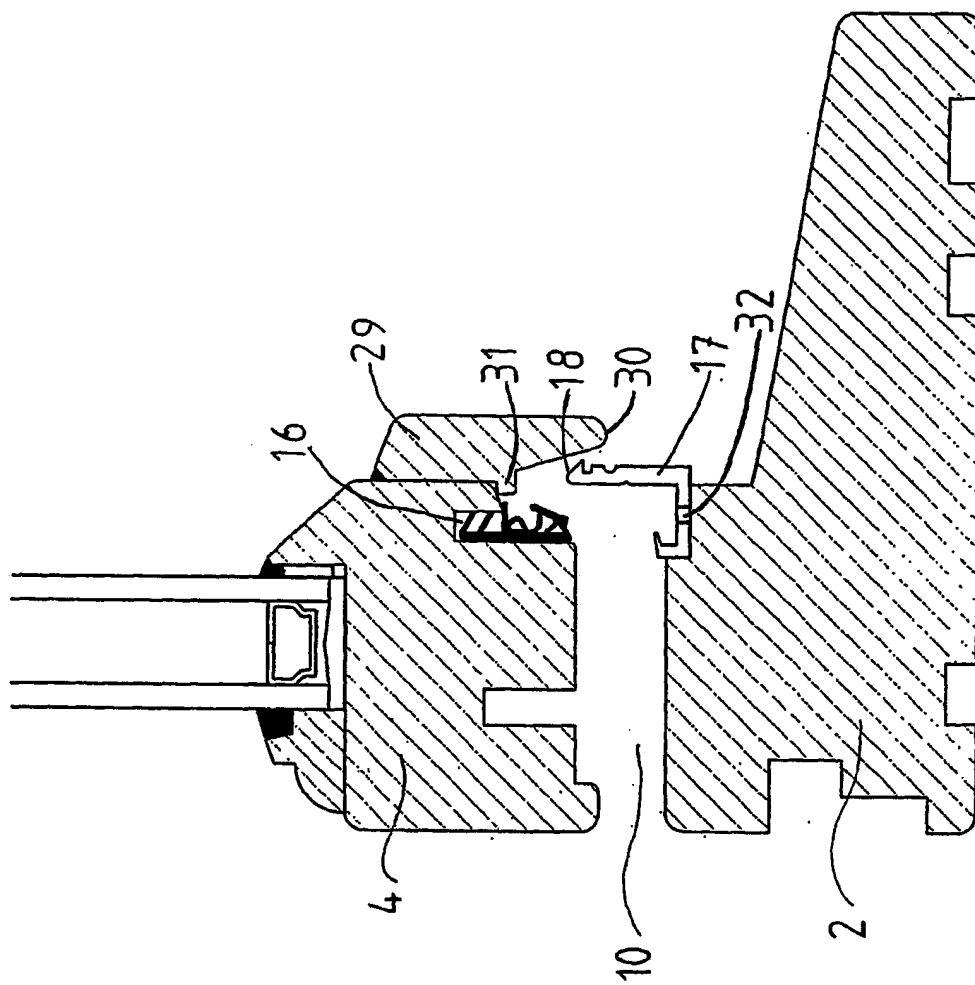


Fig. 10

## INTERNATIONAL SEARCH REPORT

PCT/DK 03/00370

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 E06B3/44

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E06B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 185 955 A (PEDERSEN SVEND A S) 16 February 1993 (1993-02-16) the whole document	1-21
A	--- US 6 216 392 B1 (DIGINOSA ANTHONY V) 17 April 2001 (2001-04-17) the whole document	1-21
A	--- GB 2 245 927 A (JAMES BLAIR & SON LTD) 15 January 1992 (1992-01-15) the whole document	1-21
A	--- GB 2 275 956 A (PLUS PLAN) 14 September 1994 (1994-09-14) the whole document	1-21
	-----	

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"B" document member of the same patent family

Date of the actual completion of the international search

29 September 2003

Date of mailing of the international search report

14 10. 2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

ÅKE OLOFSSON /ELY

# INTERNATIONAL SEARCH REPORT

PCT/DK 03/00370

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5185955	A	16-02-1993	DK 706588 A GB 2226357 A ,B	21-06-1990 27-06-1990
US 6216392	B1	17-04-2001	NONE	
GB 2245927	A	15-01-1992	NONE	
GB 2275956	A	14-09-1994	NONE	